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B7V BE

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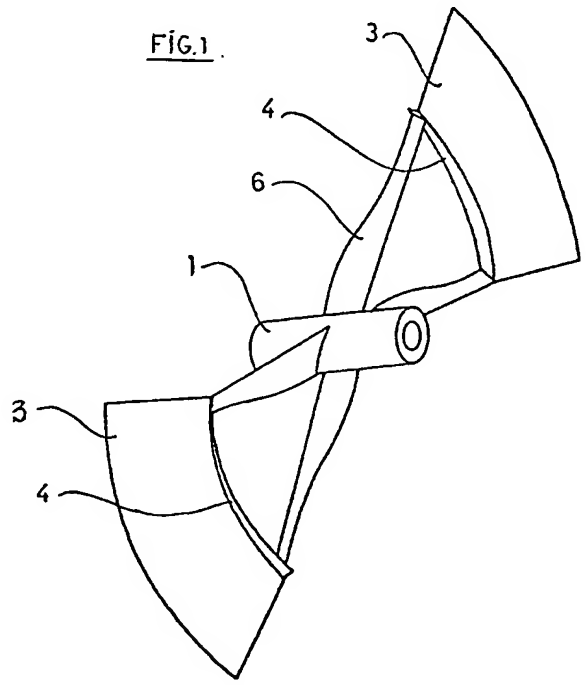
GB 1190271
GB 0780910
GB 0430893

(58) Field of search
B7V
F1V

(54) Improvements in propellers

(57) A propeller for ship propulsion consists of trapezoidal helically shaped wings (3) which are arranged planetarily about its axis of rotation advancing axially in a screwing mode. The wings of the propeller, constituting a portion of a complete spiral of a screw, are disposed at a certain distance (radius) from their axis of rotation, on the same or on a different perpendicular or transverse plane to the axis of the hub (1) and at the same or a different radius, being mounted on the hub by means of arms (6). The wings (3) tend to momentarily (instantaneously) immobilize a mass of water in which the propeller is operating, thus attaining a support on a solid and steady (or almost solid and steady) body/mass and consequently causing axial advance in a screw-like manner like a worm screw.

FIG.1



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The drawing(s) originally filed was (were) informal and the print here reproduced is taken from a later filed formal copy.

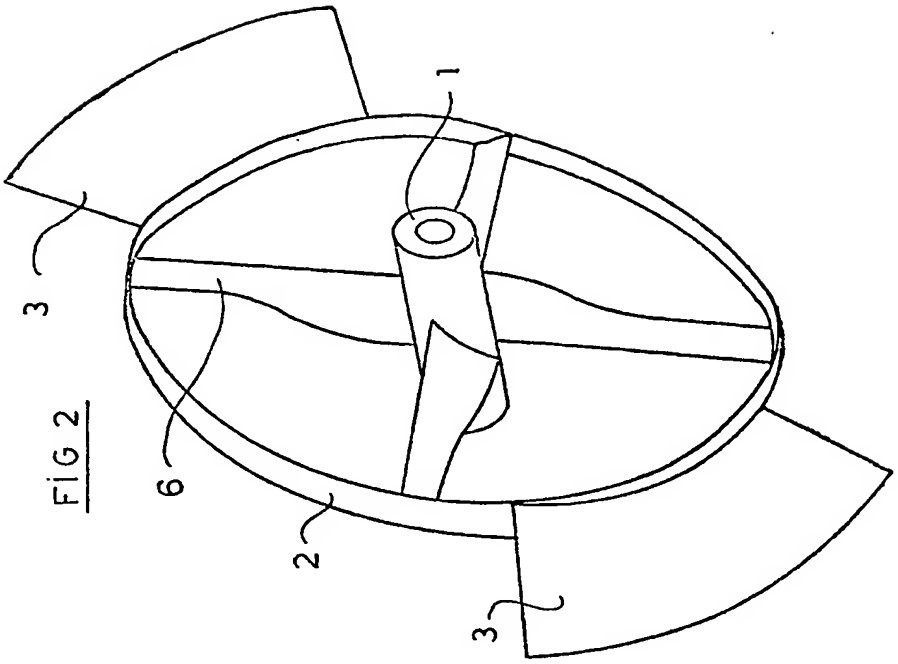

FIG 2

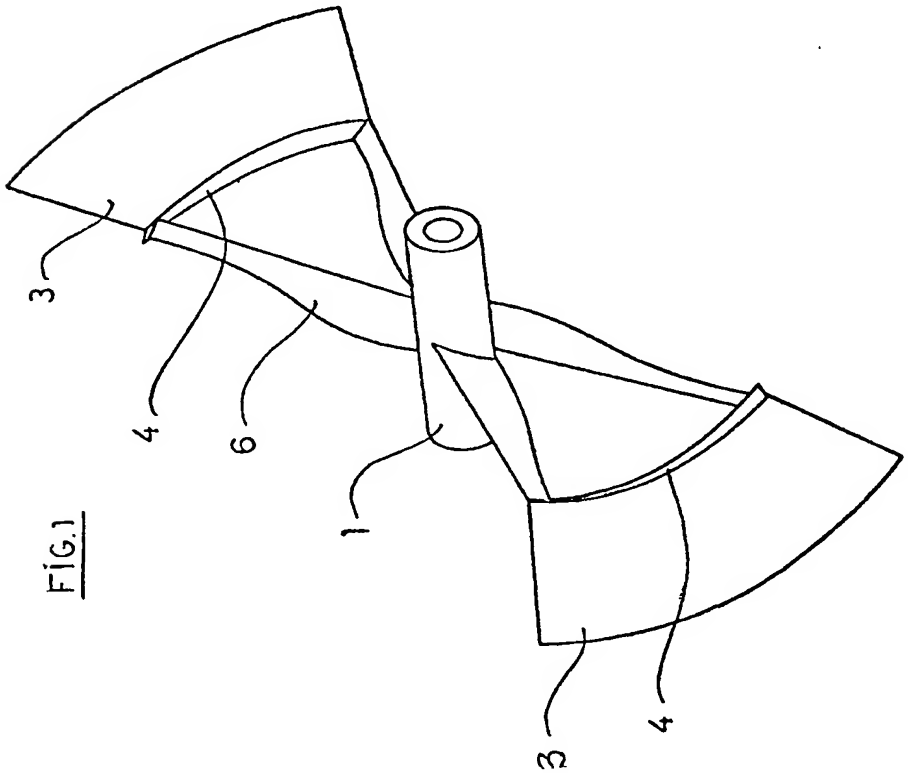

FIG.1

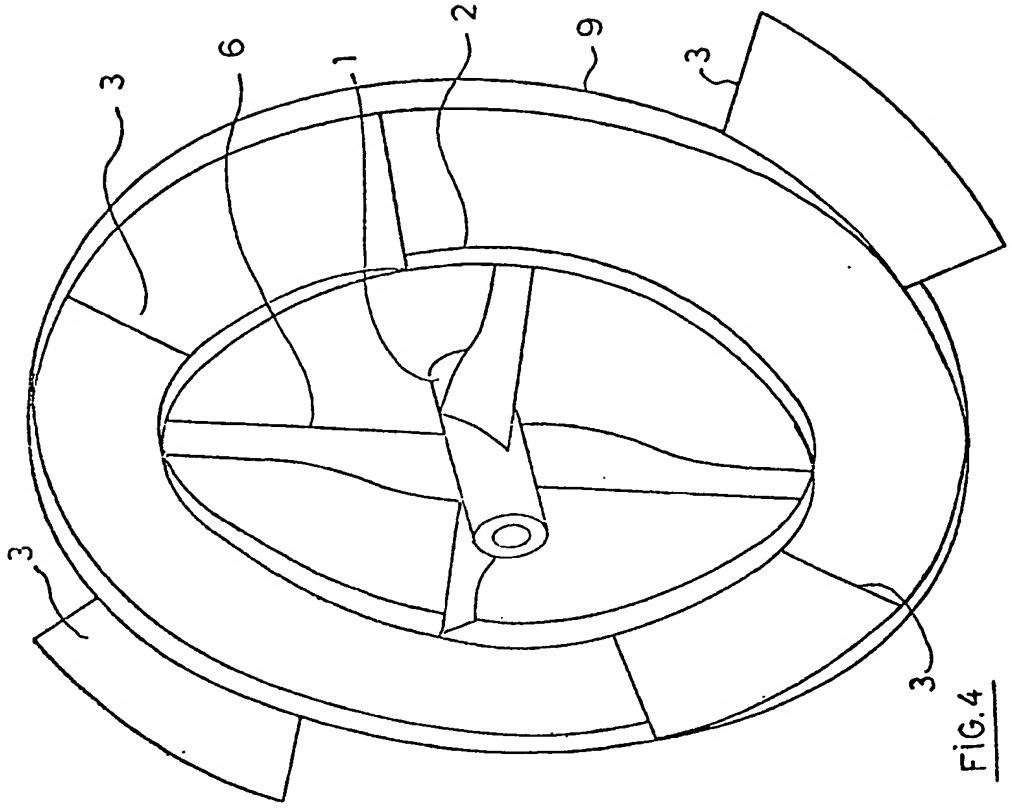

FIG.4

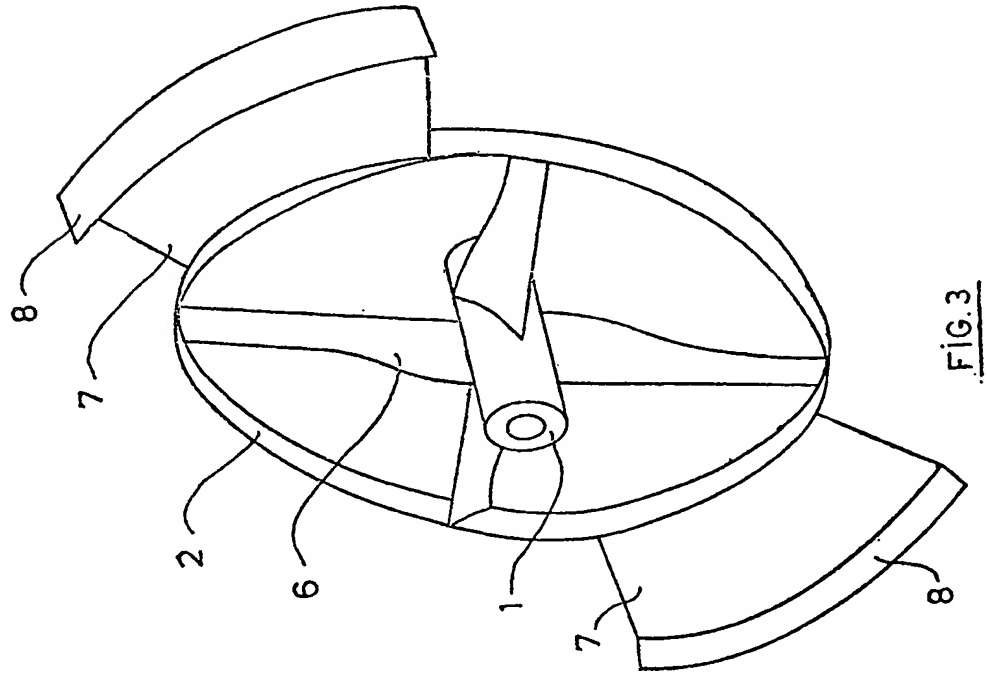

FIG.3

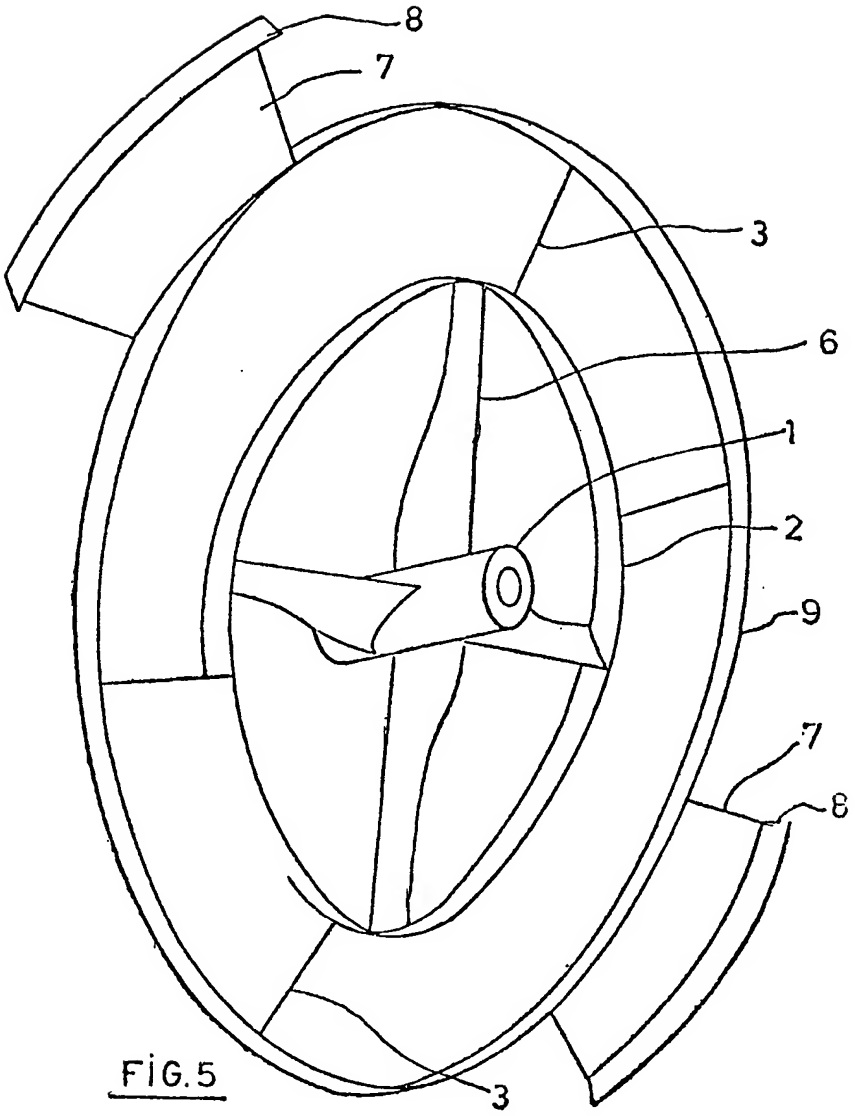

FIG.5

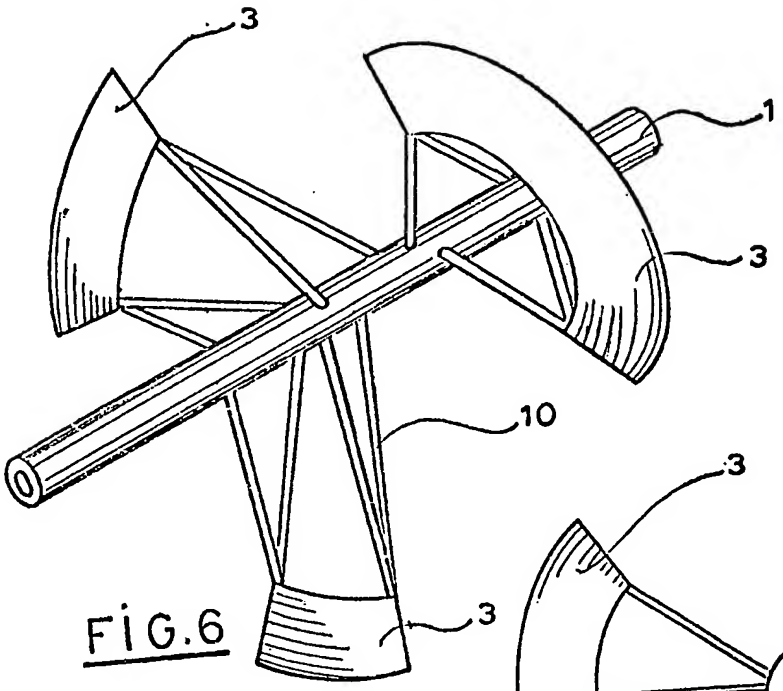

FIG.6

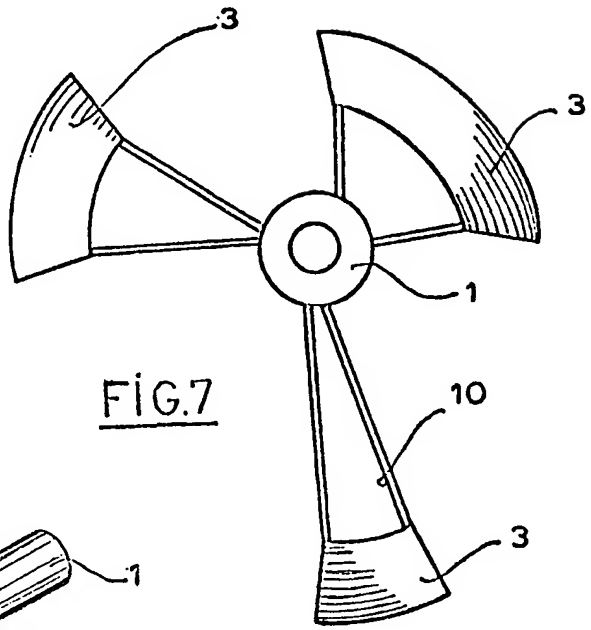

FIG.7

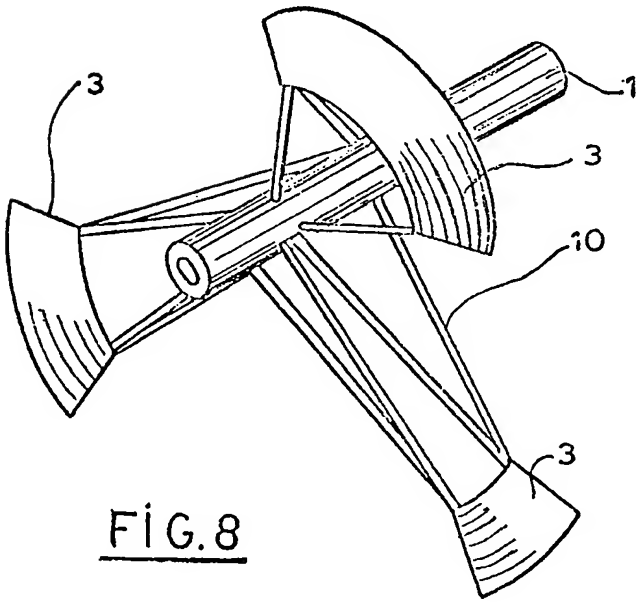

FIG.8

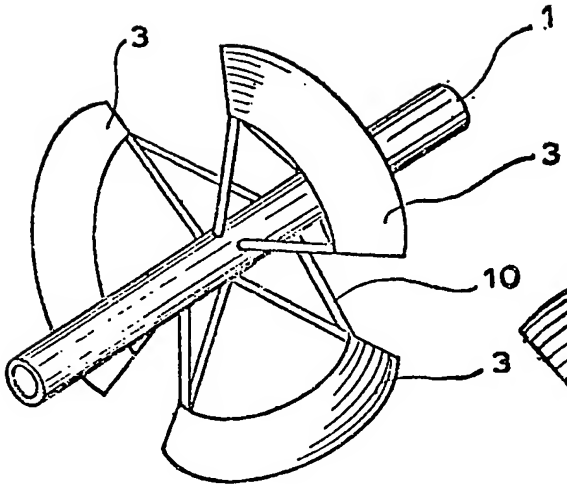

FIG.9

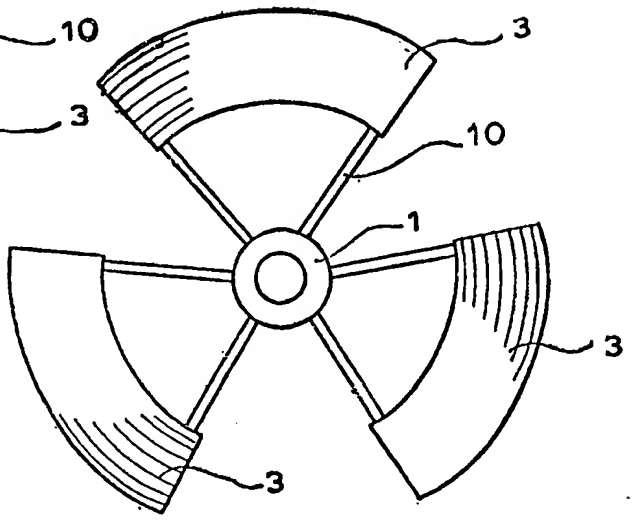

FIG.10

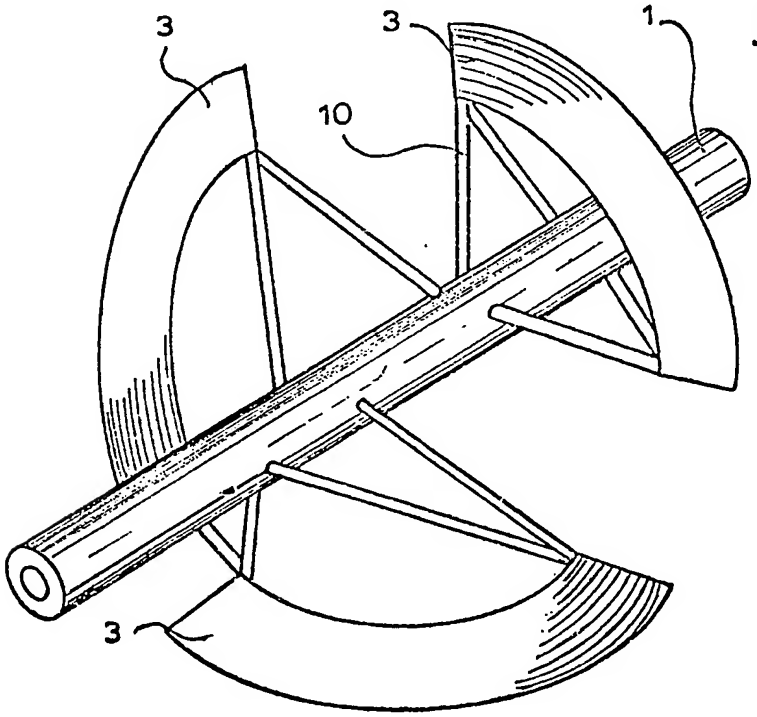

FIG.11

SPECIFICATION

Improvements in propellers

This invention relates to propellers intended for the propulsion of ships and like watercraft.

According to one aspect of the invention, there is provided a propeller for ship propulsion whose operation, based on the force of inertial resistance of the mass of water (axiom of the bodies' inertia) and on the principle of the inclined plane, creates in the mass of water momentarily (instantaneously) conditions and behaviour of a solid and stable body (or at any rate, conditions and behaviour approximating those corresponding to a solid and stable body) and being screwed in it achieves an axial movement equal or close to its pitch per one revolution, in the manner of a worm screw, thus attaining zero or minimal slip, said propeller having one or more wings of helical shape disposed planetarily about its axis of rotation in a track of certain radius and at an inclined position in respect of the track of their circular movement (such inclination constituting the pitch of the propeller), these features being combined with the circular velocity of the wings, the area and form of the wings, the inclination or pitch of the wings, and the angular arc defined between two successive edges of the wings,i.e. between a trailing and the successive leading edge.

The construction of a propeller for ship propulsion according to the invention is such that the wings - one, two or more - are situated at a certain distance from its hub or axis of rotation and are disposed planetarily about it on a track (distance) that may be either of the same radius for all wings (in the case of two or more wings) or different. Axially (the longitudinal position to the axis of rotation of the hub), the wings may be arranged either on the same or on a different, for each one of them, transverse plane. Angularly, on the circle plane of their tracks, the wings may be disposed/phased either uniformly (i.e. arranged/keyed at an angle between them equal to 360° divided by the number of wings) or irregularly. Further, the wings are disposed at an inclined angle with respect to the track of their rotation - the magnitude of such inclination determining the pitch of the propeller.

The ultimate and main advantage of the propeller according to the invention, compared to the traditional propeller used at present for ship propulsion, consists in the higher co-efficient of efficiency it achieves.

The higher co-efficient of efficiency, which was the pursued goal of the invention, is achieved with the functional activation of two basic features that refer to its construction and its principle of operation. The first feature refers to the arrangement, the shape, the number and the circular velocity of the wings of the propeller and the second refers to the principle on which its operation is based, i.e. the manner in which it acts and thus produces the propulsive motion. The propeller according to the invention operates like a screw, i.e., it moves - advances - axially in every complete revolution by a distance corresponding to its pitch in the water mass just as if it were operating in a solid and stable environment (screw in a nut). For such an operation it makes use of the inertial resistance of the water mass (one of the consequences of the principle of the inertia of bodies) and of the principle of the inclined plane. With the specific characteristics of construction of the propeller and mainly with the disposition and circular velocity of its wings, what is achieved is: firstly, the instantaneous immobilization (inertness) of the mass of the water with which the pressure side of the wings comes in contact successively and continuously - while the propeller is rotating - creating thus a solid and steady support (or else, creating a continuous solid nut) and secondly, the desired axial advancement of the wings - consequently, propulsive motion of their axis/hub to which they transfer such movement. In other words the operation of the propeller according to the invention may be compared to that of a worm screw.

The propeller according to the invention may carry wings planetarily disposed about its hub, on the same perpendicular axis to the hub and on a track of the same radius, said wings being attached to circular ring arcs or to a circular ring and said arcs or ring being supported on the hub by means of arms of helicoidal shape. Preferably, the wings are provided with deviators formed in their outer circumferencial edges.

Alternatively, a propeller for ship propulsion according to the invention may carry wings planetarily disposed about its hub, on the same perpendicular to the axis of the hub, on two concentric tracks formed by circular rings whose radii are different from one another and with an equal number of wings on each ring, the inner ring being supported on the hub by means arms of helicoidal shape and the otuer ring being supported on the wings mounted on the inner ring. The outer circumferential edge of the outer track wings may form a deviator.

According to another alternative, a propeller for ship propulsion according to the invention may carry wings planetarily disposed about its hub, in tracks whose radii are different from one another and which are perpendicular to the axis of the hub, the area of the wings differing from each other, each being inversely proportional to the track radius, and the tracks being supported on the hub by means of arms. The wings may be disposed in the same or different planes which are perpendicular to the axis of the hub.

The invention will now be further described, by way of example, with reference to the drawings, in which:-

Figure 1 is a perspective view of one embodiment of a propeller according to the invention;

Figure 2 is a perspective view of a second embodiment of a propeller according to the invention;

Figure 3 is a perspective view of a modification of the embodiment of the propeller shown in Figure 2;

Figure 4 is a perspective view of another embodiment of a propeller according to the invention;

Figure 5 is a perspective view of a modification of the embodiment of the propeller shown in Figure 4;

Figure 6 is a perspective view of a further embodiment of a propeller according to the invention;

Figure 7 is a front view of the propeller shown in Figure 6;

Figure 8 is a perspective view of a modification of the embodiment of the propeller shown in Figures 6 and 7;

Figure 9 is a perspective view of yet another embodiment of a propeller according to the invention;

Figure 10 is a front view of the propeller shown in Figure 9; and

Figure 11 is a perspective view of a modification of the embodiment of the propeller shown in Figures 9 and 10 of the drawings.

In the drawings, like parts are denoted by like reference numerals.

Referring to the drawings, the propeller shown in Figure 1 has two wings 3, of helically constant pitch shaped surface which are disposed planetarily about its hub in the same perpendicular or transverse plane to the longitudinal axis of the hub 1, on a track of the same radius. Each wing 3 is attached to a respective circular ring arc 4, which arcs are supported on the hub 1 by means of respective arms 6 which are shaped helicoidally in the same constant pitch as the wings 3.

Figure 2 shows a propeller with two wings 3, of helically-constant pitch shaped surface, disposed planetarily about its hub 1 in the same perpendicular or transverse plane to the axis of the hub 1, on a track of the same radius. The wings 3 are attached to a circular ring 2 which is supported on the hub 1 by means of arms 6 which are shaped helicoidally in the same constant pitch as the wings 3.

Figure 3 shows a propeller with two wings 7, of helically-constant pitch shaped surface, disposed planetarily about its hub 1 in the same perpendicular or transverse plane to the axis of the hub 1 on a track of the same radius. The wings 7 are attached to a circular ring 2 which is supported on the hub 1 by means of arms 6 which are shaped helicoidally in the same constant pitch as the wings 7 and each wing is provided on its outer circumferential edge with a deviator in the form of an arcuate blade 8.

Figure 4 shows a propeller with four wings 3, of helically-constant pitch shaped surface, disposed planetarily about its hub 1, in the same perpendicular or transverse plane to the axis of the hub 1 on two concentric tracks whose radii are different from one another. The tracks are formed by two concentric circular rings with two wings 3 attached to the inner ring 2 and the other two wings 3 attached to the outer ring 9. The inner ring 2 is supported on the hub 1 by means of helicoidally shaped arms 6 and the outer ring 9 is supported on the wings 3 of the inner track.

Figure 5 shows a propeller with four wings 3 and 7, of helically-constant pitch shaped surface, disposed planetarily about its hub 1, in the same perpendicular or transverse plane to the axis of the hub 1, on two concentric tracks whose radii are different from one another. As in the embodiment shown in Figure 4, the tracks are formed by two concentric circular rings with the two wings 3 attached to the inner ring 2 and the two wings 7 attached to the outer ring 9. The inner ring 2 is supported on the hub 1 by means of helicoidally shaped arms 6 and the outer ring 9 is supported on the wings 3 of the inner track. The outer circumferential edge of each outer track wing 7 is provided with a deviator in the form of an arcuate blade 8.

The propeller shown in Figures 6 and 7 is provided with three wings 3, of helically-constant pitch shaped surface, of areas different from one another, which are disposed planetarily about its hub 1, on tracks whose radii are different from one another. The wings 3 are supported on the hub 1 by means of arms 10 and are located in perpendicular or transverse planes to the axis of the hub 1 which are different from one another.

The propeller shown in Figure 8 of the drawings is similar to the propeller shown in Figures 6 and 7 except that the three wings 3 are disposed planetarily about its hub 1 on the same perpendicular or transverse plane to the axis of the hub 1.

The propeller shown in Figures 9 and 10 of the drawings is also provided with three wings 3, of helically-constant pitch shaped surface, which are disposed planetarily about its hub 1, on a track of the same radius. The wings 3 are supported on the hub 1 by means of arms 10 on the same perpendicular or transverse plane to the axis of the hub 1.

The propeller shown in Figure 11 of the drawings is similar to the propeller shown in Figures 9 and 10 except that, in this case, the three wings 3 are disposed planetarily about its hub 1 in perpendicular or transverse planes to the axis of the hub 1 which are different from one another.

The invention can be applied in any shape, form, combination, design or method desired. The drawings are not meant and do not constitute a restrictive form or design of the invention but merely indicative descriptive examples.

As it has already been mentioned, the propeller according to the invention, while rotating in the mass of water, advances axially in a screwing mode (by a screwing action), i.e. advances as its wings are supported in the mass of water which (mass) is being immobilized (inerted) - in contrast to the mode of axial movement of the traditional propeller which advances by displacing (pumping) mass of water and the ensuing reaction on its blades. The movement of the propeller according to the invention along its axis of rotation, in the screwing mode, is achieved by the inclined position (pitch) of the wings in respect to the track of rotation - an arrangement that, during rotation, creates the condition for the development in the mass of water of inertial resistance, necessary to provide a solid and stable support to the wings for the helical axial advancement.

CLAIMS

1. A propeller for ship propulsion whose operation, based on the force of inertial resistance of the mass of water (axiom the bodies' inertia) and on the principle of the inclined plane, creates in the mass of water momentarily (instantaneously) conditions and behaviour of a solid and stable body (or at any rate, conditions and behaviour approximating those corresponding to a solid and stable body) and being screwed in it achieves an axial movement equal or close to its pitch per one revolution, in the manner of a worm screw, thus attaining zero or minimal slip, said propeller having one or more wings of helical shape disposed planetarily about its axis of rotation in a track of certain radius and at an inclined position in respect of the track of their circular movement (such inclination constituting the pitch of the propeller), these features being combined with the circular velocity of the wings, the area and form of the wings, the inclination or pitch of the wings, and the angular arc defined between two successive edges of the wings, i.e. between a trailing and the successive leading edge.

2. A propeller for ship propulsion carrying wings planetarily disposed about its hub, on the same perpendicular to the axis of the hub and on a track of the same radius, said wings being attached to circular ring arcs supported on the hub by means of arms of helicoidal shape.

3. A propeller for ship propulsion carrying wings planetarily disposed about its hub, on the same perpendicular to the axis of the hub and on a track of the same radius, said wings being attached to a circular ring supported on the hub by means of arms of helicoidal shape.

4. A propeller according to claim 2 or claim 3, wherein the wings are provided with deviators formed in their outer circumferential edges.

5. A propeller for ship propulsion carrying wings planetarily disposed about its hub, on the same perpendicular to the axis of the hub, on two concentric tracks formed by circular rings whose radii are different from one another and with an equal number of wings on each ring, the inner ring being supported on the hub by means of arms of helicoidal shape and the outer ring being supported on the wings mounted on the inner ring.

6. A propeller according to claim 5, wherein the outer circumferential edge of the outer track wings forms a deviator.

7. A propeller for ship propulsion carrying wings planetarily disposed about its hub, in tracks whose radii are different from one another and which are perpendicular to the axis of the hub, the area of the wings differing from each other, each being inversely proportional to the track radius, and the tracks being supported on the hub by means of arms.

8. A propeller according to claim 7, wherein the wings are disposed on the same perpendicular to the axis of the hub.

9. A propeller for ship propulsion carrying wings planetarily disposed about its hub, in a track of the same radius, on the same perpendicular plane to the axis of the hub and supported on the hub by means of arms.

10. A propeller for ship propulsion carrying wings planetarily disposed about its hub, in a track of the same radius but on different perpendicular planes to the axis of the hub and supported on the hub by means of arms.

11. A wing for the propeller claimed in any one of the preceding claims, said wing being of trapezoidal form and helical-constant pitch shape which tends to be a true plane as the radius of its track is greater.

12. A propeller for ship propulsion substantially as described herein with reference to the drawings.

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